

Bur Oak Windbreak Planting, Teton County, MT

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Objective: Windbreak planting

County: Teton County, MT

Average Annual Precipitation: 11 - 14 inches

MLRA: 43A, Northern Rocky Mountains

Dominant Soil Type: Marias and Havre-Ryell, silty clay loam

Elevation: 3650 ft

Site Preparation: Cultivation

Planting Date: May 14, 2011

Planting Method: Conservation District's tree planter, fabric for weed control, and wire fence with tires for tree protectors

Previous Site History: Cultivated crop field

Herbicide: Glyphosate applied for chemical fallow

Irrigation: None, site has adequate moisture

Grazing: Wildlife only, wire plant cages with tires were used to protect plants

Monitoring Dates: 2012, 2013, 2014, 2015, and July 2020



Fig. 1. Bur oak reached an 8-foot average height ten years after planting.

Table 1. Planted species and their percent survival, July 2020.

Scientific Name	Common Name	Material	Spacing (feet)	Number Planted	Number Alive 2020	Percent Survival
<i>Quercus macrocarpa</i>	Bur oak	bareroot	12	131	120	87%

Introduction:

The objective of this project was to test bur oak (*Quercus macrocarpa*) for windbreak plantings in central Montana (Table 1). Ekalaka Germplasm bur oak is a long-lived, native, deciduous tree with a medium to tall mature stature in Montana and Wyoming (up to 50 feet). It has strong branches, and is drought-tolerant and winter hardy, with few pest problems. Bur oak grows well on a variety of sites including rocky hillsides, limestone soils, droughty soils, clayey sites, and other marginal locations -- given full sun conditions. Bur oak has the potential to provide protection from wind and soil erosion when used in windbreaks and shelterbelts. It is also suited for field borders, living snow fences, wildlife habitat improvements, visual screens, naturalistic landscapes, and more.

In May 2011, nine-inch tall, dormant bareroot plants that were installed using a conservation tree planter with six foot weed barrier fabric and wire cages for browse protection. Tires were also used around the base of the trees for deer and fabric (i.e. wind) protection. In addition, the area between rows of trees was kept fallow using herbicide. The weed barrier, chemical fallow, and occasional tillage protected the seedlings from competition with weed and grass cover that can choke-out a planting. Bur oak was the inside (leeward) row of a five-row / five-species windbreak. Row spacing was 17 feet and between plant spacing was 12 feet.

Results:

Bur oak had 87% survival after ten years with the mortality occurring the first year after planting. At five years after planting, trees averaged 5 ½ feet tall and 2 feet wide. In ten years, the seedlings grew from a nine-inch height to an average of 8 feet tall and 4 ½ feet wide with a 1-inch DBH.

There was no insect, disease or drought damage of the foliage reported in any monitoring year but portions of trees that extended outside the protective cage were browsed by deer. The five-row windbreak was being used by deer and upland birds. The four-foot wire cages provided better protection from browsing than the three-foot wire cages. Bur oak usually begin reproduction at approximately 8 to 9 years of age; however, there was no sign of bur oak reproducing (i.e. acorns) on the site.



Fig. 2. When mature, bur oak produce acorns that are used by a variety of wildlife species.



Fig. 3. A study at the Bridger Plant Materials Center found that growth rate of bur oak was four times greater on a fallow/cultivated site compared to a vegetated site where seedlings had to compete with existing grass.

Summary:

- Bur oak had good survival at this central Montana site, making it a good option for windbreaks or other conservation uses in the region.
- Weed barrier, protective cages, and between-row fallow conditions were important for controlling weeds and competitive vegetation.
- The larger wire cages provided better long-term protection than the shorter cages.
- Bur oak had no signs of insect, disease, or drought damage ten years after planting.
- For more windbreak planting information, see [Conservation Trees and Shrubs for Montana](#), and follow planting and spacing guidelines as described in NRCS Conservation Practices for Windbreak/Shelterbelt Establishment (380) and Windbreak/Shelterbelt Renovation (650).

